

Remarks

This application has been carefully reviewed in light of the Office Action dated February 25, 2004. Claims 12 to 17, 27 to 29, 33 to 35, 37 to 49, 51 to 62 and 65 to 66 are currently in the application, of which Claims 12 to 17, 27 to 29 and 33 have been withdrawn from consideration. Claims 34, 49 and 61 are the independent claims currently under consideration. Reconsideration and further examination are respectfully requested.

Initially, Applicants thank the Examiner for the indication that Claims 41, 44 to 46 and 57 to 60 contain allowable subject matter and would be allowable if rewritten in independent form. Applicants have not rewritten these claims in independent form at this time since all claims currently under consideration in the application are believed to be in condition for allowance, as discussed in detail below.

Claim 64 has been canceled without prejudice or disclaimer of the subject matter contained therein. Claims 37, 40, 46, 51, 57, 58 and 60 have been amended to correct typographical errors and to place these claims in better form.

Claims 47 and 54 were rejected under 35 U.S.C. § 112, second paragraph, for allegedly being indefinite. In response, Applicants have amended Claims 47 and 54 to particularly point out and distinctly claim the subject matter of the present invention. Reconsideration and withdrawal of the § 112, second paragraph, rejection of Claims 47 and 54 are respectfully requested.

Claims 49, 51 to 54, 56, 61 and 64 to 66 were rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 5,905,591 (Duncan); Claims 34, 35, 37 to 40, 42, 43, 55 and 62 were rejected under 35 U.S.C. § 103(a) over Duncan in view of U.S. Patent No. 4,101,195 (Korsch); and Claim 48 was rejected under 35 U.S.C. § 103(a) over Duncan in view of Korsch and further in view of the LAMA Project Overview (LAMA). Applicants have carefully considered each of the

rejected claims together with the applied references and respectfully submit that the claims currently under consideration are patentably distinguishable over the applied references for at least the following reasons.

The present invention concerns the control of distortion in collector telescopes utilized in a distributed aperture telescope array. Specifically, the present invention concerns the correction of sine magnification errors using a phase plate with the collector telescopes. By using an appropriately configured phase plate, sine magnification errors can be corrected over the field of view of the telescope.

With reference to particular claim language, independent Claim 34 concerns a distributed aperture telescope having multiple three mirror anastigmats (TMAs) positioned within the distributed aperture. Each TMA includes a primary mirror device configured to receive electromagnetic radiation from one or more sources, a secondary mirror device coupled to the primary mirror device and configured to redirect a portion of the electromagnetic radiation reflected from the primary mirror device, and a tertiary mirror device coupled to the secondary mirror device and configured to redirect a portion of the electromagnetic radiation reflected from the secondary mirror device. An intermediate image plane is disposed between the secondary mirror device and the tertiary mirror device. A phase plate is disposed within a vicinity of the intermediate image plane, where the phase plate is configured to correct sine magnification error of the portion of the electromagnetic radiation over the field of view of the TMA.

Independent Claim 49 concerns a distributed aperture optical system comprising multiple collector telescopes each having an image plane at which images are formed. The system further includes multiple phase plates corresponding to the plurality of collector telescopes, where each phase plate is disposed approximately at or near the image plane of a corresponding collector

telescope. Each phase plate has a surface adapted to correct sine magnification error in the images over the field of view of the collector telescope.

Independent Claim 61 concerns a method of adjusting a phase relationship in a distributed aperture optical system. The method includes the steps of receiving electromagnetic radiation from one or more sources at a first mirror device and receiving a portion of the electromagnetic radiation reflected from the first mirror device at a second mirror device. A portion of the electromagnetic radiation reflected from the second mirror device is transmitted through a phase plate that is configured to correct sine magnification error of the electromagnetic radiation over the field of view of the system. Finally, a portion of the electromagnetic radiation transmitted through the phase plate is received at a third mirror device.

The applied references are not seen to disclose or suggest the foregoing features of the present invention. In particular, the applied references are not seen to disclose or suggest at least the feature of using a phase plate to correct a sine magnification error over the field of view of a telescope system.

Duncan concerns a multi-aperture imaging system in which the movement of mirrors within the optical paths of respective subaperture telescopes is controlled to modify the path length of beams originating from the respective subaperture telescopes. The Office Action contended that these mirrors correspond to the phase plates of the claimed invention. Applicants respectfully disagree with this interpretation of Duncan.

In column 6, lines 44 to 49, Duncan describes moving mirrors 48 and 50 to ensure that the path lengths of beams originating from the subaperture telescopes are made equal. While Duncan is seen to be silent regarding sine magnification errors, the Office Action contended that sine magnification errors are inherent in distributed aperture imaging systems and that the movement of mirrors in the optical paths of the beams reduces at least some of the sine

magnification error. In making this contention, the Office Action appeared to rely on Applicants' disclosure on page 3 of the subject application that indicates that the internal steering system of Duncan mitigates the sine magnification error to some extent.

The mitigation of sine magnification errors mentioned on page 3 of the subject application does not refer to the full field of view of the telescope, but rather refers to a relatively small portion of the field of view. Specifically, by steering the line of sight of a telescope, a point of interest can be placed in a portion of the field of view where the effects of sine magnification errors are minimal. For example, as shown in Figure 8 of the subject application, sine magnification errors have little effect on the portion of the field of view between -0.025 degrees and 0.025 degrees. Using the internal steering of Duncan, points of interest can be placed within this portion of the field of view where the effects of sine magnification errors can be mitigated. However, as can be seen from Figure 8, without the phase plates of the present invention, once the field angle goes beyond 0.025 degrees sine magnification error degrades the image. Accordingly, the internal steering of Duncan is not seen to correct sine magnification errors of an image over the entire field of view of the imaging system.

Therefore, Duncan is not seen to disclose or suggest the claimed features of the present invention. In particular, Duncan is not seen to disclose or suggest at least the feature of using a phase plate to correct sine magnification error over the field of view of a telescope system.

Korsch and LAMA are not understood to disclose or suggest anything to remedy the foregoing deficiencies of Duncan. Korsch was cited for its disclosure of an anastigmatic three-mirror telescope and LAMA was cited for its disclosure of large distributed aperture telescopes. However, neither Korsch nor LAMA are understood to disclose or suggest at least the feature of using a phase plate to correct sine magnification error over the field of view of a telescope system.

Accordingly, independent Claims 34, 49 and 61 are believed to be allowable over the applied references. Reconsideration and withdrawal of the § 102(b) rejection of Claims 49 and 61 and the § 103(a) rejection of Claim 34 are respectfully requested.

The other claims currently under consideration in the application are dependent from the independent claims discussed above and therefore are believed to be allowable over the applied references for at least the same reasons. Because each dependent claim is deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing amendment and remarks, all of the claims currently under consideration in the application are believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

Applicants' undersigned attorney may be reached in our Orange County office by telephone at (949) 851-0633. All correspondence should be directed to our address given below.

Respectfully submitted,

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